

[Name of Document] What Is Claimed

[Claim 1] A plasma film forming apparatus for forming a film on a substrate using plasma, comprising:

5 a processing container for processing the substrate accommodated therein;

a mounting unit for mounting the substrate thereon in said processing container;

a high frequency wave supply unit for supplying a high frequency wave for plasma generation into said processing container;

10 a flat-plate structure provided between said high frequency wave supply unit and said mounting unit and partitioning an inside of said processing container into a region on said high frequency wave supply unit side and a region on said mounting unit side; and

15 a plasma excitation gas supply port for supplying a plasma excitation gas from a lower side toward the region on said high frequency wave supply unit side,

wherein said structure is formed with a source gas supply port for supplying a source gas for film formation into the region on said mounting unit side and an opening for allowing plasma generated in the region on said high frequency wave supply unit side to pass to the region on said mounting unit side.

[Claim 2] The plasma film forming apparatus as set forth in claim 1, wherein a plurality of said plasma excitation gas supply ports are formed.

25 [Claim 3] The plasma film forming apparatus as set forth in claim 2, wherein said plasma excitation gas supply ports are arranged to be

able to uniformly supply the plasma excitation gas to the region on said high frequency wave supply unit side.

[Claim 4] The plasma film forming apparatus as set forth in claim 1, further comprising:

5 another plasma excitation gas supply port for supplying the plasma excitation gas from a lateral side to the region on said high frequency wave supply unit side.

[Claim 5] The plasma film forming apparatus as set forth in claim 4, wherein said plasma excitation gas supply port is formed at a central
10 portion of the region on said high frequency wave supply unit side in a plan view.

[Claim 6] The plasma film forming apparatus as set forth in claim 1, wherein said plasma excitation gas supply port is formed upward from the lower side of the region on said high frequency wave supply unit side.

15 [Claim 7] The plasma film forming apparatus as set forth in claim 1, wherein an upper surface of said structure has a plasma excitation gas supply pipe through which the plasma excitation gas passes arranged along the upper surface of said structure, and

wherein said plasma excitation gas supply port is formed in said
20 plasma excitation gas supply pipe.

[Claim 8] The plasma film forming apparatus as set forth in claim 7, wherein said plasma excitation gas supply pipe is arranged in a lattice form in a plan view on the upper surface of said structure.

[Claim 9] The plasma film forming apparatus as set forth in claim 1,
25 wherein said structure has a gas supply pipe leading to a supply source of the source gas, arranged in a lattice form in a plan view,

wherein a plurality of said source gas supply ports are formed in said gas supply pipe,

wherein said gas supply pipe also leads to a supply source of the plasma excitation gas, and

5 wherein said source gas supply port has a function as said plasma excitation gas supply port.

[Claim 10] The plasma film forming apparatus as set forth in claim 1, further comprising:

10 a sensor for detecting a concentration distribution of the plasma excitation gas in the region on said high frequency wave supply unit side.

[Claim 11] A plasma film forming method for forming a film on a substrate using a plasma film forming apparatus comprising a processing container for processing the substrate accommodated therein; a mounting unit for mounting the substrate thereon in the processing container; and a high
15 frequency wave supply unit for supplying a high frequency wave for plasma generation into the processing container, in which a plasma generation region is formed between the mounting unit and the high frequency wave supply unit where plasma is generated from a plasma excitation gas, said method comprising the steps of:

20 supplying the plasma excitation gas from a lateral side and a lower side to the plasma generation region, and adjusting each of supply flow rates of the plasma excitation gases from the lateral side and the lower side to conduct a control so that concentrations of the plasma excitation gas are uniform in the plasma generation region.